

Droplets bouncing over a vibrating fluid layer

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Abstract

This is an entry for the Gallery of Fluid Motion of the 65st Annual Meeting of the APS-DFD (fluid dynamics video). This video shows the motion of levitated liquid droplets. The levitation is produced by the vertical vibration of a liquid container. We made visualizations of the motion of many droplets to study the formation of clusters and their stability.

1 Introduction

If a liquid drop is deposited over a liquid surface, the drop will, first, rebound, then arrest and eventually coalesce. Couder et al. [1] reported a technique to retard indefinitely the coalescence phase. By making the liquid container, the drop can be made to ‘sit’ on top of the surface for a long time period. We built a similar experiment to study how several droplets cluster.

2 Experimental Conditions

A short glass container was mounted on top of a commercial loudspeaker. The loudspeaker was fed with an amplified signal from a function generator. The frequency and amplitude of the signal were chosen such that large surface instabilities were not observed (Faraday waves). The liquid used was tap water. A small amount of liquid soap was used; we found that in this manner the drops were more stable. The process was filmed with a high speed camera.

3 Videos

Our video contributions can be found at:

- Video 1, mpeg4, full resolution
- Video 2, mpeg2, low resolution

References

- [1] Y. Couder, E. Fort, C.-H. Gautier, and A. Boudaoud, From Bouncing to Floating: Noncoalescence of Drops on a Fluid Bath, *Phys. Rev. Lett.* **94**, 177801 (2005).